



# 25

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Cheng-Tsung Ni et al.

Application No.: 09/216,078

Filed: December 18, 1998

For: METHOD OF  
SIMULTANEOUSLY IMPLEMENTING  
DIFFERENTIAL GATE OXIDE  
THICKNESS USING FLUORINE  
BEARING IMPURITIES

Examiner: J. Garcia

Art Unit: 2823

AMENDMENT

Assistant Commissioner for Patents  
Washington, D.C. 20231  
Sir:

I, Cheng-Tsung Ni, being duly warned that willful false statements and the like are punishable by fine or imprisonment or both, under 18 U.S.C. § 1001, and may jeopardize the validity of the patent application or any patent issuing thereon, state and declare as follows:

1. All statements herein made of my own knowledge are true and statements made on information or belief are believed to be true. A graphical representation of experimental data produced in relation to experiments performed at Mosel Vitelic, Inc. is attached hereto as Exhibit A.

2. I have worked in the field of semiconductor electronics in excess of 14 years. I am currently employed as Manager at Mosel Vitelic, Inc.

3. I have read the above-identified patent application and I am familiar with the invention described by the specification. I have also read the Examiner's Office Action mailed on January 15, 2002. The Examiner's rejections appear to be based upon

**RECEIVED**

SEP 25 2003

**OFFICE OF PETITIONS**

09216078

201430

02/11/2003 SLUANG1 00000001

168.00 CH  
54.00 CH03 FC:1201  
04 FC:1202

her understanding of the Grider et al. reference. More particularly, the Examiner suggests that because " Grider et al. teaches that increasing the halogen concentration results in decreasing the oxide thickness, that the inventions disclosed and claimed in the above-identified patent application are not enabled under 35 U.S.C. §112. Office Action at pp. 3-4.

Experimental evidence verifies that adding a halogen, such as Flourine to a substrate at a concentration higher than approximately 1E14 per square centimeter *increases* oxide thickness at locations where the halogen is introduced. Figures 3A and 3B of Exhibit A depict this experimental evidence. Figure 3A illustrate a differential in gate oxide thickness achieved in one experiment where Flourine was implanted into a substrate at a given implant energy. The concentration of the Flourine is depicted along the X-axis of the graph, while the resulting oxide thickness is depicted along the Y-axis of the graph. As can be seen in Figure 3A, the thickness of the gate oxide increased from 48 Angstroms to 62 Angstroms as the Flourine concentration was increased from 1E14 per square centimeter to 1E15 per square centimeter. Figure 3B illustrates another experiment where similar results were achieved. As illustrated, the thickness of the gate oxide increased from 98 Angstroms to 121 Angstroms as the Flourine concentration was increased from 1E14 per square centimeter to 1E15 per square centimeter

The above-identified patent application describes various embodiments where halogen containing impurities are introduced into a substrate to increase oxide thickness. Based on these embodiments, one of ordinary skill in the art would be taught how to make and use the claimed inventions without undue experimentation.

As just one example, the above-identified patent application discloses introducing Flourine impurities 107 into an exposed region of a substrate 100. Application at Figs. 2A-2B, p. 8, ll. 26-31. The Application then proceeds to describe one example of implant dosage and energy. Application at p. 8, l. 31 - p. 9, l. 3. A thermal oxidation is then performed, and as illustrated in Fig. 2C, an oxide layer of increased thickness grows over the region where the impurities were formed.

Application at p. 9, ll. 3-9. Based on this exemplary disclosure, one of ordinary skill in the art would be taught how to make and use the claimed inventions without undue experimentation.

Dated: Jan 24, 2003

By: Cheng-Tsung Ni  
Cheng-Tsung Ni  
Device Department Manager  
Mosel Vitelic, Inc.

Attachment: Exhibit A

DE 7092874 v1